

CONSTRUCTION STANDARD SPECIFICATION

SECTION 13851

HONEYWELL FIRE ALARM SYSTEM

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CONSTRUCTION STANDARD SPECIFICATION

SECTION 13851

HONEYWELL FIRE ALARM SYSTEM

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes the requirements to modify an existing Honeywell proprietary fire alarm system. Modifications may involve Honeywell Data Gathering Panels, alarm initiating devices, notification appliances, and accessory equipment necessary for a complete and functional Honeywell proprietary fire alarm system. This Section does not include modifications to the Honeywell proprietary supervising station fire alarm system at Building 829.

1.02 REFERENCES

- A. The current editions of the following standards are part of this Section:

NFPA 70 - National Electrical Code

NFPA 72 - National Fire Alarm Code

- B. Related Standard Drawings:

1. E-0006STD, "Standard Symbols & General Notes".
2. FA5002STD, "Conventional Initiation Device Details".
3. FA6001STD, "Honeywell Fire Alarm Equipment Schedule".
4. FA7001STD, "Fire Alarm Wiring Diagrams".
5. FA7002STD, "Notification Appliance Wiring Diagrams".

- C. Related Construction Standard Specifications:

1. Division 1, Section 01330, "Submittal Procedures".
2. Division 7, Section 07270, "Firestop and Smokestop Systems".
3. Division 9, Section 09900, "Painting".
4. Division 16, Section 16001, "Electrical Work".

- D. Conflicts between the references and this Section shall be referred to the Sandia Delegated Representative (SDR) who will determine which standard shall govern.

1.03 SUBMITTALS

- A. Fire Alarm System Operational Test Checklist (included in Attachments to this Section).
- B. Honeywell representative shall provide a marked-up DGP Schedule showing the final as-built condition of the Data Gathering Panel to the SCO at the time of acceptance testing.
- C. Honeywell representative shall provide DGP Panel Schedule for mounting on door for FS90 DGP listing zone numbers and descriptors for all initiation and notification zones.
- D. Provide set of “marked-up” drawings including all equipment relating to the fire alarm system installed as part of this work. Show junction boxes, conduit sizes, devices, and any other information relevant to the as-built condition. Show conduit and junction box locations on the as-builts if they were shown on the original plans. Provide as-built drawings to SCO at closeout of the contract.

1.04 QUALITY ASSURANCE

- A. The fire alarm system shall be supplied from a distributor normally engaged in installation and maintenance of fire alarm systems, with at least three years' history of providing factory service in Albuquerque, New Mexico.
- B. Comply with NFPA 72.

1.05 DEFINITIONS

- A. DGP: Data Gathering Panel
- B. NAC: Notification Appliance Circuit
- C. SCO: Sandia Construction Observer
- D. Fire Safety Functions: Building and fire control functions that are intended to increase the level of life safety of occupants or control the spread of the harmful effects of fire. Examples include elevator recall, door holders, and smoke removal systems.
- E. Proprietary Supervising Station: The Honeywell Delta 1000 equipment located at Buildings 829, 802, 956, and the KAFB Fire Station #2.
- F. Definitions in NFPA 72 apply to fire alarm terms used in this Section.

1.06 SYSTEM DESCRIPTION

- A. Honeywell Delta 1000 system at the proprietary supervising station at Building 829 monitors alarms reported from a Honeywell FS20A or FS90 Data Gathering Panel (DGP) located at each protected building or group of buildings.

- B. The DGP is a noncoded, zoned system with manual and automatic alarm initiation devices with separate individual circuits for each zone of fire alarm initiation and notification appliances.
- C. Initiation zones are 4-wire Class A supervised circuits that report alarm, trouble, and supervisory signals from initiation devices (such as pullstations, smoke detectors, flow switches, tamper switches) to the DGP.
- D. Notification appliances (bells, strobes) are 2-wire Class B supervised circuits that activate to evacuate building(s) upon receipt of an alarm signal.
- E. Miscellaneous control circuits may be activated (such as smoke removal fans, dampers, door holders, elevator recall) upon receipt of an alarm signal.
- F. DGP reports signal data to proprietary supervising station at Building 829 Telephone Switch Building over dedicated Fire Alarm Reporting System (FARS) phone lines to one of two Central Processing Units (CPUs)
 - 1. The CPUs are connected to two Honeywell Delta Net Professional Computers (DPCs) that relay alarm and system information to computer terminals at the KAFB Fire Station at Wyoming and "F" Streets and the Sandia Security Headquarters Communication Center (HCC) at Buildings 802 and 956.
 - 2. The alarm and action messages indicate the building number, tech area location, zone number, zone description (by floor, wing, etc.), hazard description, and fire department dispatch information.

1.07 SEQUENCING AND SCHEDULING

- A. Complete work according to the sequence of work described below.
 - 1. Install new conduit runs and other new equipment that will not disrupt existing equipment, as far as practical.
 - 2. When adding new initiation or notification appliance circuits, coil and tape new wires in DGP for termination by a Honeywell representative.
 - 3. When modifying existing initiation or notification appliance circuits, contact SCO to schedule blockout of the impacted circuits to minimize disruption of fire alarm system.
 - 4. Upon completion of work, contact Honeywell representative to install required DGP components, terminate wiring, and perform required DGP programming to communicate with the proprietary supervising station in Building 829.
 - 5. Upon completion of work, demonstrate in presence of Honeywell representative and SCO the proper operation of: DGP, each alarm initiating device, each notification appliance, each control function, each ancillary system actuation, ground fault condition, power failure, battery stand-by, and other appropriate tests to verify that fire alarm system performs in accordance with this Section and manufacturer's data. Document test results on the "Fire Alarm System Operational Test Checklist" included in Attachments of this Section, and provide copy to SCO.

6. Contact SCO to request acceptance testing by Sandia Fire Alarm Maintenance personnel. SCO will complete "Request for Fire Alarm System Acceptance Testing" form, included in the Attachments of this Section, and provide a copy of completed "Fire Alarm System Operational Test Checklist" to Planner for the Sandia Fire Alarm Maintenance organization.
 7. Sandia Fire Alarm Maintenance personnel will perform acceptance testing of fire alarm system in presence of Contractor, the Honeywell representative and Sandia Fire Protection Engineering.
- B. Interruption of Existing Fire Alarm System
1. Do not interrupt existing fire alarm system without first obtaining written permission from the Sandia Delegated Representative (SCO) not less than 24 hours prior to such interruptions. Contractor shall make every effort to keep existing fire alarm system on line until the new system is operational. This may be accomplished by requesting blockouts from Sandia Fire Alarm Maintenance to jumper out only those areas where Contractor is involved in his work.
 2. Proceed continuously and expeditiously with work to be performed during the interruption until the system is restored to service. When requesting permission to interrupt service, specifically state the work to be performed, with the exact time and length of service interruption. Request separate permission for each interruption.
 3. Post temporary sign ("ATTENTION – In Case of Fire Call 911") on each new or existing pullstation during such times that it is installed but not in service. Refer to Attachments of this Section for sample sign that can be photocopied to use as notification.
 4. Coordinate all work concerning active portions of fire protection systems with the SCO to prevent false alarms and avoid unnecessary loss of protection.
 5. Maintain existing fire alarms in service during non-standard working hours and over weekends. If unable to do so, notify SCO.
- C. As new equipment is installed, label it "NOT IN SERVICE" until it is accepted and placed in-service.
- D. Remove existing disconnected fire alarm equipment and restore damaged surfaces. Package and deliver unused functional fire alarm equipment to the Fire Alarm Maintenance Supervisor.
- E. Coordination with Sprinkler System Installation
1. Do not install raceway and wiring to sprinkler system components until the sprinkler system submittals have been accepted by Sandia Fire Protection Engineering.
 2. Proceed to install raceways and wiring when the location for all sprinkler system devices requiring connection to the fire alarm system have been installed by the sprinkler contractor.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
 - 1. Honeywell, Inc.
 - 2. Wheelock, Inc.

2.02 FUNCTIONAL DESCRIPTION OF SYSTEM

- A. Control of System: By the DGP.
- B. System Supervision: Automatically detect and report open circuits, shorts, and grounds of wiring for initiating device, notification appliance circuits, and signal line to the proprietary supervising station at Building 829.
- C. Priority of Signals: Automatic alarm response functions resulting from an alarm signal from one zone or device are not altered by subsequent alarm, supervisory, or trouble signals. Annunciate and display all alarm, supervisory, and trouble signals regardless of priority or order received.
- D. Noninterference: A signal on one zone shall not prevent the receipt of signals from other zones.
- E. System Reset: All zones are manually resettable from the DGP after initiating devices are restored to normal.
- F. Transmission to Proprietary Supervising Station: Automatically route alarm, supervisory, and trouble signals to proprietary supervising station at Building 829 by means of a tone signal transmitted over telephone lines.
- G. System Alarm Capability during Circuit Fault Conditions: System wiring and circuit arrangement prevents alarm capability reduction when a single ground or open circuit occurs in an initiating device circuit.
- H. Loss of primary power at the DGP initiates a trouble signal at the DGP and transmits a trouble signal to the proprietary supervising station.
- I. Basis Alarm Performance Requirements: Unless otherwise indicated, operation of a manual pullstation, automatic alarm operation of a heat detector, operation of a sprinkler flow or pressure device, or alarm operation of a smoke detector initiates the following:
 - 1. Notification appliance operation.
 - 2. Identification at the DGP and proprietary supervising station of the zone originating the alarm.
 - 3. Transmission of an alarm signal to the remote proprietary supervising station.

4. Release of fire and smoke doors held open by magnetic door holders.
 5. Recall of elevators.
 6. Shutdown of fans and other air-handling equipment.
 7. Recording of the event by the proprietary supervising station system printer.
- J. Alarm Silencing, System Reset and Indication: Controlled by switches in the DGP.
1. Silencing-switch operation halts alarm operation of notification appliances and activates an “alarm trouble” light. Display of identity of the alarm zone or device is retained.
 2. When alarm-initiating devices return to normal and system reset switch is operated, the silencing-switch can be set to normal position without notification appliances operating.
- K. Operating a heat detector in the elevator shaft shuts down elevator power by operating a shunt trip in a circuit breaker feeding the elevator.
- L. Water-flow alarm for connection to sprinkler in an elevator shaft and elevator machine room shuts down elevators associated with the location without time delay.
- M. Sprinkler valve-tamper switch operation initiates the following:
1. A supervisory signal indication for the zone involved at the DGP and proprietary supervising station.
 2. Recording of the event by the proprietary supervising station system printer.
- N. Low air pressure switch operation on a dry-pipe or preaction sprinkler system initiates the following:
1. A supervisory signal indication for the zone involved at the DGP and proprietary supervising station.
 2. Recording of the event by the proprietary supervising station system printer.
- O. Removal of an alarm initiating device or a notification appliance initiates the following:
1. A “trouble” signal indication for the zone involved at the DGP and proprietary supervising station.
 2. Recording of the event by the proprietary supervising station system printer.

2.03 STANDARD FIRE ALARM EQUIPMENT

- A General: Provide initiation, notification appliance, and accessory devices as shown in Table 1, "Standard Fire Alarm Equipment", unless otherwise indicated on Contract Drawings.

Table 1 – Standard Fire Alarm Equipment

Device Type	Description	Standard Dwg. FA6001STD Equip. List Symbol Number
Panels	FS90 DGP Components	20
	FS90 1-Up Enclosure (for fire safety function controls and auxiliary power supplies)	53, 54
Initiation Devices	Manual Pull Station	8
	Photoelectric Smoke Detector, including base	39
	Smoke Detector base with relay for relay applications	40
	Heat Detector, combination rate-of-rise and fixed temperature (135° F)	41
	Heat Detector, combination rate-of-rise and fixed temperature (200° F)	42
	Duct Detector	43
Notification Appliances	Wheelock Power Supply	37
	Electronic Multitone Horn	45
	Electronic Multitone Horn/Strobe	46
	Electronic Strobe	47
	6" Vibrating Bell (outside use only)	9
	End-of-Line Resistor (EOLR), 1.91K ohm	36
Fire Safety Function Devices	Floor Mounted Door Holders	49
	Flush Mounted Door Holders	50
	24 VDC Power Supply	52

- B. Fire alarm initiating, notification appliance, and accessory devices shall be tested and listed by UL and/or approved by FM as a component part of the Honeywell Delta 1000 system, unless specifically noted on the drawings.

C. Initiating Devices

- Manual Pullstations: Gamewell, cottage style, weatherproof, Vitiguard, non-coded stations for outdoor installations.
- Provide Honeywell duct detector sampling tubes as listed below to correspond with the specific duct size.

<u>Tube Part Number</u>	<u>Outside Duct Width</u>
ST-1.5	1 to 2 feet
ST-3	2 to 4 feet
ST-5	4 to 8 feet
ST-10	8 to 12 feet

- Supervisory Devices: N.O. or N.C. switches as indicated on drawings.

- D. Remote Duct Detector Annunciators
 - 1. Remote LED Annunciator: Honeywell RA400Z single-gang box mounted unit with alarm-indicating LED.
 - 2. Remote Test Station: Honeywell RTS451KEY single-gang box mounted remote test station unit with test, reset, and LED alarm annunciation.
- E. Notification Appliances: Honeywell SC806C 6" Vibrating Bell for bells located outside.

2.04 PANELS

- A. Wheelock Power Supply: Notification appliance power supply, 24 VDC with 8-amp output, and two (2) each 12V, 12 AH sealed lead acid batteries.
- B. Fire Alarm Terminal Cabinet: NEMA 1 telephone-type enclosure with hinged door, latch handle, painted red, sized as indicated on Drawings.
- C. Provide nameplates on Fire Alarm Terminal Cabinets and Wheelock Power Supplies in accordance with Standard Drawing E-0006STD.
- D. DGP Control Panel: FS90 1-Up enclosure with door.

2.05 MAGNETIC DOOR HOLDERS

- A. Description: Floor-mounted or flush mounted, as indicated on Drawings.
- B. Rating: 120 VAC or 24 VDC, as specified on equipment list
- C. Make/Model: Honeywell S4003B series for floor-mounted units; S4003A series for flush-mounted units.

2.06 DATA GATHERING PANEL

- A. Fire Alarm Data Gathering Panel: Honeywell DeltaNet FS90 Fire & Security System compatible with the Honeywell Delta 1000 system.
- B. FS90 DGP components consists of the following devices in the quantities required to ensure a fully operable system:
 - 1. Honeywell 2-up enclosure (with knockouts), and enclosure door designed for use with the FS90 DGP components.
 - 2. Motherboard: Provides eight function-board slots, each with an associated terminal block for field wiring.
 - 3. Control Board "CA": One "CA" function board required for every four (4) motherboards.
 - 4. Initiating Board "AB": One "AB" function board required to monitor two (2) supervised circuits for N.O. alarm devices.

5. Indicating Board "BF": One "BF" function board required to activate two (2) supervised Class B notification circuits. "BF" boards include two relays with user-selectable N.O. or N.C. contacts for auxiliary control circuits.
6. Communication Board "LD": One "LD" function board required for every four (4) motherboards to interface over phone lines with other Honeywell Delta 1000 equipment in Building 829.
7. Static Modules: One Static Module required for each phone pair terminated at a Communication Board "LD" (total of 2 per board).
8. Power Supply: One 4A @ 28 VDC power supply required for each motherboard.
9. Battery Supervision Module: Each power supply/battery combination requires one Battery Supervision Module (1 per panel) for battery supervision.
10. Batteries: Two 12V, 26 Ah gel-type batteries connected in series to provide 24 VDC standby power.
11. Interconnect cables for strapping motherboards inside the enclosure and between different DGP enclosures.
12. Power supply cables and battery harnesses.
13. Other function boards as specified on the DGP schedule.
14. Card Retainers (1 per motherboard) and Legend Cards as required for installed function boards.

2.07 WIRE

- A. Wire and cable for fire alarm system shall be UL listed and labeled as complying with NFPA 70, Article 760.
- B. Initiating Device Circuits (IDC): IDC cables shall be 2 twisted #16 AWG solid copper unshielded, color-coded red and black, Belden 9572 or equivalent.
 1. Duct Detector Power: 24 Vdc power to duct detectors shall be 2 twisted #14 AWG solid copper, unshielded, color-coded red and black, Belden 9580 or equivalent
- C. Notification Appliance Circuits (NAC): NAC cables shall be 2 twisted #14 AWG solid copper, unshielded, color-coded red and black, Belden 9580 or equivalent.
- D. DGP and Wheelock AC Power Circuits: #12 THHN, color-coded per Table 2 – "Fire Alarm Wiring Color Code".
- E. Telephone Transmission Circuit: 8-conductor CAT5 telephone cable.
- F. Conduit, wiring, boxes, and cabinets shall conform to NEC requirements for branch circuit wiring.

PART 3 - EXECUTION

3.01 EQUIPMENT INSTALLATION

A. Requirements

1. Install fire alarm system equipment in accordance with this Section, the Contract Drawings, and the manufacturer's recommendations.
2. Each initiating device shall be installed where it is accessible for periodic maintenance and testing.
3. Mount initiation devices and notification appliances at the elevations and locations to comply with NFPA 72 requirements and the manufacturers' specifications.
4. Install all fire alarm devices per their UL listing or approval.

B. Data Gathering Panel

1. Termination of initiation, notification appliance, and control circuits to be done by:
 - a. A Honeywell representative when Honeywell equipment is installed in an existing DGP.
 - b. Sandia Fire Alarm Maintenance when no new Honeywell equipment is installed in an existing DGP.
2. Do not terminate 120 VAC control circuits inside DGP enclosure.
3. All parts of the fire alarm system shall be free of grounds.

C. Fire Alarm Terminal Cabinets

1. Install to allow accessibility from the finished floor with a minimum workspace of 3 feet in front of panel.
2. Label panel door with warning label "DANGER: 120 VAC INSIDE" if panel contains 120 VAC control circuits.
3. Terminate 120 VAC control wiring on separate terminal blocks from 24 VDC wires.
4. Paint enclosure red to identify panel as fire alarm equipment.
5. Install DGP Control Panel dedicated for fire safety functions immediately below or adjacent to the FS90 DGP panel.

D. Wheelock Power Supply

1. Provide 120 VAC source on dedicated branch circuit(s). Identify circuit-disconnecting means as "FIRE ALARM CIRCUIT CONTROL". Label branch circuit designation of the circuit powering inside the panel.
2. Install to allow accessibility from the finished floor with a minimum workspace of 3 feet in front of panel.

E. Manual Pullstations

1. Install manual pullstations semiflush in recessed back boxes unless indicated otherwise on Drawings.
2. Mount manual pullstations 4'-0" above finished floor in highly visible locations on exit egress routes. When shown on Drawings near doorways, install pullstation on the latch side of door immediately adjacent to the door frame wherever possible.

F. Smoke Detectors

1. Ceiling-Mounted Smoke Detectors: Install not less than 4 inches from a side wall to the near edge. For exposed solid-joist construction, mount detectors on the bottom of joists. On smooth ceilings, install not more than 30 feet in any direction.
2. Wall-Mounted Smoke Detectors: Install at least 4 inches, but not more than 12 inches, below ceiling.
3. Do not install smoke detectors until after cleanup of all construction trades is complete and final. Do not remove dust covers provided with detector until the time of the final acceptance testing of the fire alarm system.
4. Install smoke detectors a minimum of 3 feet from air supply registers. Do not install in direct airflow of a register.

G. Duct Detectors

1. Install duct detectors, its' housing and sampling tubes in strict conformance with the manufacturer's installation instruction and the guidance on Standard Drawing FA5002STD.
2. Install duct detector housings in duct where it can be accessed for maintenance of smoke detector. When a ladder cannot be used to access duct detector from finished floor, provide access door or platform where a maintenance worker can reach the duct detector. The platform shall support a minimum of 300 pounds.
3. Install directional labels pointing toward duct detectors installed in locations not readily visible by personnel from the finished floor. Note the zone number for the duct detector on the labels.
4. Install sampling tubes so they extend the full length of the duct with the sampling holes facing into the airflow.

5. Power for duct detectors shall be provided by a 24 VDC power supply installed in a FS90 DGP Control Panel (1-Up enclosure), unless specified otherwise on Drawings.
6. Install a Honeywell RTS451KEY Remote Test Station (RTS) for each duct detector. Group and locate RTSS in the nearest electrical closet or equipment room at accessible location from the finished floor. Label each RTS to indicate the duct detector activated by the RTS.
7. When specified on Drawings, install Honeywell RA400Z Remote Annunciator for each duct detector installed above a drop in ceiling that is accessible for testing, but the alarm LED is not readily visible to responding personnel from the finished floor. Install Remote Annunciator on ceiling immediately below the duct detector, unless specified otherwise on Drawings. Label the annunciator to indicate which detector is connected.

H. Heat Detectors

1. Install not less than 4 inches from a side wall to the near edge. For exposed solid-joist construction, mount detectors on the bottom of joists. On smooth ceilings, install not more than 50 feet in any direction.
2. Heat Detectors in Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location.

I. Water-Flow Detectors: Connect for each sprinkler line required to be alarmed, as indicated on Contract Drawings.

J. Valve Supervisory Switches

1. Connect for each sprinkler valve station required to be supervised, as indicated on Contract Drawings.
2. Do not wire supervisory switches (such as valve tamper switches) which report to the Fire Station and Security as "SUPERVISORY" signal on same zone as device reporting as "ALARM" signal (such as flow switches, pressure switches).

K. Notification Appliances

1. Surface-mount notification appliances on the wall between 80 and 96 inches above finished floor, and minimum of 6 inches below the ceiling.
2. Configure settings of multitone electronic bells and bell/strobe combinations to operate as bell tone on HI setting. Refer to Standard Drawing FA7002STD for instructions on the proper set-up of device.

L. Accessory Devices

1. Do not terminate control circuits for accessory devices (such as door holders, smoke removal, fan shutdown, elevator recall, etc.) in the DGP or Wheelock power supply. Provide a separate FS90 1-Up enclosure for termination of control wiring and associated relays.

2. Do not power magnetic door holder circuits off the DGP power supply.

3.02 WIRING INSTALLATION

- A. Install conduit, wiring, boxes, cabinets, etc., in accordance with NEC, NFPA, and manufacturer's approved shop drawings.
- B. Conduits may or may not be shown on the Drawings depending on the complexity of the installation. Unless specified on Drawings, the exact routing of conduit is at the discretion of the Contractor.
 1. Refer to Division 16, Section 16001 "Electrical Work" for conduit installation requirements.
 2. Do not install 120 VAC circuits in same conduit with fire alarm 24 VDC circuits.
- C. Paint J-box and pull box covers red to readily identify devices as part of the fire alarm system.
- D. Wire devices shown on Drawings according to the Fire Alarm Riser diagram. All conductors installed shall be continuous from device to device, from device to terminal block, or from terminal block to terminal block. Wire splices of any kind are not allowed in junction boxes, wireways, raceways, or elsewhere.
- E. Label conductors as shown on Standard Drawing FA7001STD. Refer to Division 16, Section 16001 "Electrical Work" for the approved methods.
- F. Color-code wires in accordance with Table 2 - "Fire Alarm Wiring Color Code".
 1. Color-code initiating zone and notification appliance circuit zone wiring as shown on DGP schedule.
 2. Color-code single-phase 120 VAC power wiring per requirements on Standard Drawing E-0006STD.
- G. Do not terminate 12 AWG wire (with the exception of 120 VAC circuit wiring) on the terminal strips in FS20 and FS90 DGPs. Terminal strips in the FS90 DGP are not designed to accept 12-gauge wire.
- H. Honeywell representative performs all wire terminations in the DGP and the initial powering up of the DGP.

Table 2 - Fire Alarm Wiring Color Code

Circuit Type	Description	Color Code	Wire Type
AC Power	Hot	Phase A - Black Phase B - Red Phase C - Blue	#12 THHN
	Neutral Ground	White Green	
Battery	Positive (+)	Blue	#12 THHN
	Negative (-)	Brown	
Notification Appliances	Positive	Red	2-conductor #14 AWG twisted copper, unshielded cable
	Negative	Black	
Initiating Devices	Initiating Device Circuits (IDC)	(+) Red (-) Black	2-conductor #16 AWG twisted copper, unshielded cable
Telephone Cable	Transmit	White/Blue	CAT5 telephone cable
	Receive	White/Orange	

3.03 IDENTIFICATION

- A. Install nameplates on outside door of fire alarm terminal cabinets and Wheelock power supplies in accordance with Standard Drawing E-0006STD.
- B. Label each initiation device and notification appliance with zone number for circuit it is connected to at DGP. Provide Brother P-Touch 3 labels with TC-10 tape cartridge, or equal.
- C. For smoke detector bases with relays that are used for shunt trip, fan shutdown, or elevator recall, label the base "SHUNT TRIP", "FAN SHUTDOWN" or "ELEVATOR RECALL" as appropriate for the relay application.
- D. Paint J-box and pull box covers red to identify as fire alarm equipment.
- E. Conduit Labeling
 1. Brown $\frac{3}{4}$ " tape (Scotch #351) at each joint and termination for conduits containing initiating and notification circuits.
 2. Install white $\frac{3}{4}$ " tape (Scotch #351) adjacent to brown tape to identify communication conduit from DGP to IDR.
 3. Install blue $\frac{3}{4}$ " tape (Scotch #351) adjacent to brown tape for conduits containing fire alarm control circuits

3.04 FIELD QUALITY CONTROL

A. Honeywell Field Service

1. Contractor shall secure the services of Honeywell Corporation to install new DGP components, perform wiring terminations and programming changes to the Honeywell Data Gathering Panel (DGP). Honeywell representative shall approve and supervise all connections inside the DGP, and his decisions will take precedence over any connections shown on the Contract Drawings.
2. Honeywell representative shall provide supervised by-pass switch(s) in DGP as required to permit testing of the fire alarm system without actuating ancillary equipment controls. By-pass switch(s) shall be wired to provide a supervisory alarm when ancillary circuits are placed in the "OFF" or by-pass position.
3. Honeywell representative shall provide a double-gang outlet box in the DGP to permit manual switching between AC and DC power sources.
4. Honeywell representative shall install switch in DGP to permit resetting duct detectors by the momentary removal of power to the detectors.
5. Honeywell representative shall assist the Contractor in performing the final fire alarm system operation verification tests prior to requesting the acceptance testing by Sandia fire alarm system maintenance personnel.
6. Honeywell representative shall verify that the configuration of the FS90 board modules and bell loading on the notification circuits does not exceed 4 amps per motherboard.

B. Pretesting: After completion of fire alarm system installation, complete "Fire Alarm System Operational Test Checklist" included in Attachments for this Section and submit copy to SCO.

C. Acceptance Test Notice: After completion of "Fire Alarm System Operational Test Checklist", request SCO to submit "Request For Fire Alarm System Acceptance Testing" form with date for final acceptance test by Sandia Fire Alarm Maintenance.

D. Acceptance Test: Correct all minor deficiencies noted by Fire Alarm Maintenance during the time of the acceptance test.

E. NAC Decibel Level Test: Perform sound tests to determine decibel levels in all areas of the building with all NAC appliances operating on primary power. Note decibel levels on floor plans and deliver to SCO prior to system acceptance test. Install additional NAC appliances in areas with deficient decibel levels.

3.05 CLEANING

A. Cleaning: Remove paint splatters and other spots, dirt, and debris. Touch up scratches and marred finishes to match original finish.

PART 4 - ATTACHMENTS

- 4.01 Signage for Fire Alarm Impairment
- 4.02 Fire Alarm System Acceptance Testing Process
- 4.03 Request for Fire Alarm System Acceptance Testing
- 4.04 Fire Alarm System Operational Test Checklist

END OF SECTION 13851

ATTENTION

**IN CASE OF FIRE
CALL 911**

FIRE ALARM SYSTEM IS NOT OPERATIONAL AS OF:

DATE: _____

TIME: _____

FIRE ALARM SYSTEM ACCEPTANCE TESTING PROCESS

1. The Contractor performs preliminary tests on the fire alarm system to verify proper operation. Results of tests are documented by the Contractor on the “*Fire Alarm System Operational Test Checklist*” (attached).
2. The Contractor provides a copy of the completed “*Fire Alarm System Operational Test Checklist*” to the SCO and requests a date and time to have Sandia Fire Alarm Maintenance perform fire alarm system acceptance testing.
3. The SCO completes the “*Request for Fire Alarm System Acceptance Testing*” form (attached). The SCO obtains the signature of a Fire Protection Engineer to authorize proceeding with the acceptance test.
4. The SCO submits the completed “*Request for Fire Alarm Acceptance Testing*” form, with a copy of the “*Fire Alarm System Operational Test Checklist*” completed by the Contractor, to the fire alarm Planner for the Sandia Fire Alarm Maintenance Organization. Submit acceptance test request a minimum of 48 hours prior to the date requested by the Contractor.
5. Sandia Fire Alarm Maintenance performs acceptance tests in the presence of the Contractor, who will be responsible for correcting any minor deficiencies found while the tests are underway.
6. If major deficiencies are found during the acceptance tests that cannot be corrected while the tests are underway, the Contractor shall make the required corrections and repeat the acceptance test process, starting at Step 1.

REQUEST FOR FIRE ALARM SYSTEM ACCEPTANCE TESTING

TO: Fire Alarm Maintenance Planner

Mail Stop: 0934

FROM: Requestor: _____

Date: _____

Requested Acceptance Test Date: _____

Time: _____

CONDITIONS REQUIRED PRIOR TO REQUESTING ACCEPTANCE TESTING

- The Sandia Construction Observer (SCO) obtains the approval of Fire Protection to proceed with acceptance testing by Sandia Fire Alarm Maintenance.
- The SCO provides a copy of the Contractors completed "Fire Alarm System Operational Test Checklist" to Sandia Fire Alarm Maintenance verifying that the system has been tested by the Contractor and is ready for final acceptance testing by Sandia Fire Alarm Maintenance.
- A Fire Alarm Reporting System (FARS) phone line is electrically continuous from the DGP to Building 829.
- Attach a set of the Fire Alarm System drawings that depict the system(s) to be acceptance tested.

I authorize, by my signature below, that the fire alarm system is ready to be acceptance tested by Sandia Fire Alarm Maintenance personnel.

Fire Protection Approval: _____
Fire Protection Engineer

Date: _____

TEST LOCATION

Building: _____

Area: _____

Room Number(s)
(if applicable): _____

Zone Numbers: _____

Description of System(s) to be Acceptance Tested: _____

CONTRACT INFORMATION

Contract Number: _____

Project/Task
Number: _____

Electrical Inspector: _____

Phone Number: _____

Mechanical Inspector: _____

Phone Number: _____

Mechanical Contractor: _____

Contact /
Phone Number: _____

Electrical Contractor: _____

Contact /
Phone Number: _____

Refer to 1999 NFPA 72, Table 7-2.2 "Test Methods" for further instructions of the tests referenced in this checklist.

FIRE ALARM SYSTEM

Operational Test Checklist

FIRE ALARM DATA GATHERING PANEL (DGP)	Y	N/A	N
Conduit has been color-coded with 3/4" brown tape at each joint and termination	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wiring is proper type and color code for application:			
Initiation Circuits: 2/C #16 solid twisted cable Red(+) / Black (-)			
Notification Circuits: 2/C #14 solid twisted cable Red(+) / Black (-)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Control Wiring: #12 THHN Red (+) / Black (-)			
Communication: 8/C CAT5 Telephone Cable White/Blue (Transmit); White/Org (Receive)			
No 12 AWG wiring (other than 120 VAC circuit wiring) is terminated on DGP terminal strips.			
The initiation and notification circuit wiring is properly labeled	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wiring is bundled neatly and securely tie-wrapped	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bell silence switches in FS20 DGP operate properly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reset switches operate properly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A panel schedule with initiation zone and notification zone descriptors is installed in door of FS90 DGP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FS90 DGP is programmed with the proper Group/Point addresses to communicate with Building 829	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A Fire Alarm Reporting System (FARS) telephone circuit is continuous from the DGP to Building 829	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The DGP panel supervisory circuit operates properly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When the AC primary power supply is disconnected, a power fail trouble alarm occurs at the DGP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The DGP operates properly while on DC battery power for 24 hours with 5 minutes of notification device activation after the 24 hour period	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Receipt of alarm, supervisory, and trouble signals (inputs) occurs properly from each initiation device	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Notification devices (bells, strobes) operate properly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Circuit supervision, including detection of open circuits and ground faults for each initiation and notification circuit operates properly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Power supply supervision for detection of loss of AC power operates properly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Power supply supervision for detection of disconnection of secondary batteries operates properly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When activated, ancillary control panels for HSSD and fire suppression systems send the proper signals to the DGP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No grounds are on the fire alarm system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
INITIATING DEVICES	Y	N/A	N
Detectors are mounted securely	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pullstations are installed at 4'-0" above the finished floor in a visible, unobstructed location	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The initiation zone number is labeled on each wire from the DGP that is terminated at each initiation device	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The initiation zone number is labeled on the outside of each initiating device	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Remote annunciator and test stations for duct detectors operate properly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Each duct detector is accessible for periodic maintenance and testing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Each duct detector provided with Remote Test Station	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Each duct detector is powered off of the DGP Control Panel auxiliary 24 VDC power supply	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TROUBLE TEST: When a wire is lifted (for 10% of the detectors on each zone) a trouble signal is sent to the proper zone at the DGP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ALARM TEST: Each detector, when activated, sends an alarm signal to the proper zone at the DGP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NOTIFICATION DEVICES	Y	N/A	N
Notification devices are mounted securely	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The notification zone number is labeled on each wire from the DGP that is terminated at each notification device	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The notification zone number is labeled on the outside of each device	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Multitone signal devices are set (with dipswitches) to the "HI Bell" setting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TROUBLE TEST: When a wire is lifted (for 10% of the notification devices on each zone), a trouble signal is sent to the proper zone at the DGP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ALARM TEST: Each notification, when activated, functions properly and is connected to the proper zone at the DGP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Decibel levels were > than 70 dB in protected area when notification devices are activated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Notification device control cabinets function properly with DGP and connected notification circuits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

FIRE ALARM SYSTEM

Operational Test Checklist (con't)

SPRINKLER SYSTEM DEVICES	Y	N/A	N
Flow switches indicator(s) are labeled	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tamper switches are NOT connected to the same initiation zone as flow and pressure switches	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Catastrophic flow switches are NOT connected to the same initiation zone as flow and pressure switches reporting an "Alarm" signal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When the catastrophic dump flow switch is manually tripped, after an approximately 20 second time delay, an alarm appears at the proper zone in the DGP.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The 2" drain test has been performed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Test results for the backflow preventor on the sprinkler system has been provided to the Sandia sprinkler system inspector	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TROUBLE TEST: When a wire is lifted (from all of the sprinkler system devices on each zone), a trouble signal is sent to the proper zone at the DGP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ALARM TEST: Each sprinkler indication device, when activated, sends an alarm signal to the proper zone at the DGP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The sprinkler water motor gong operates properly with water flow	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On antifreeze systems, the concentration of glycerin is at the proper concentration	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On dry-pipe systems, the low pressure alarm indicating device operates properly and sends an alarm signal to the DGP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On dry-pipe systems, the air compressor has been cycled to ensure that high and low pressure points are properly set	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

FIRE SAFETY FUNCTION CONTROLS	Y	N/A	N
Smoke removal system operates properly as designed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smoke removal system is supervised	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smoke removal system components are labeled correctly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Magnetic door holder system operates properly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Elevator recall system operates correctly as specified in the Sequence of Operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

All "NO" answers to be fully explained in the Comments section below:

COMMENTS

<u>Inspector Name(s)</u>	<u>Company / Organization</u>	<u>Phone Number</u>	<u>Test Date</u>